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(72) Inventor: Zarantonello, Mario

36033 Isola Vicentina (VI) (IT)

(74) Representative: Bonini, Ercole

c/o STUDIO ING. E. BONINI SRL

Corso Fogazzaro 8

36100 Vicenza (IT)

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(71) Applicant: Gruppo Effe 2 SpA

36033 Isola Vicentina (VI) (IT)

(54) Prefabricated joist for floors and/or lintels made of a framework and brick, and brick base for said joist

(57) The invention concerns a prefabricated joist for floors or lintels (1; 10), comprising a plurality of substantially U-shaped brick bases (2; 20) that define a channel (3) in which iron bars belonging to a framework or additional iron bars are positioned and which is to be filled with concrete. Said joist is provided with a plurality of U-bolts (5), each one having its ends (51, 52) buried in the bottom (23) of said brick base, said U-bolts being spaced at regular intervals and aligned with one another in such a way as to define at least one rectilinear support for at least one additional iron bar (5, 6, 7) spaced from the bottom surface (23) of said brick base, said iron bar remaining inside the outline defined by the channel of the brick bases filled with concrete.

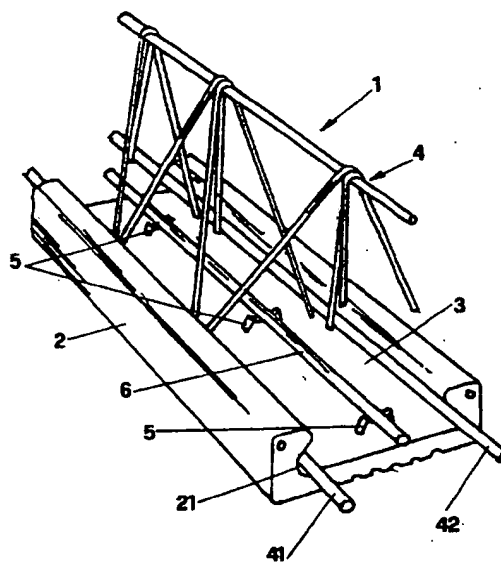


FIG. 1

## Description

The invention concerns a prefabricated floor joist made of a framework and brick, constructed so that one or more additional iron bars, in addition to the framework, can be positioned at a given distance from the bottom of the brick base that makes up the joist, said distance being sufficient for the iron bar itself to be covered all around by a concrete layer.

It is known that the regulations in force regarding the construction of floors require, among the other things, that the metal reinforcement belonging to the floor be structured so that any metal surface must be surrounded in any direction by a layer of cement mortar whose minimum thickness must be 5 mm. This is required in order to ensure maximum cohesion between cement and iron structure and also to prevent the iron from deteriorating over time due to the direct contact with the brick or the atmosphere.

In order to comply with the regulations in force concerning the construction of prefabricated joists with frameworks and brick bases, one of the methods presently adopted includes the vibration of the cement before its hardening, so that owing to the vibrations the cement mortar can penetrate among the additional iron bars and the bottom of the brick base, thus ensuring a minimum distance between said additional iron bars and said brick base.

Regarding this method, first of all it can be observed that it is rather expensive and at the same time does not guarantee the spacing prescribed by law between the additional iron bar and the bottom of the brick base.

According to the Italian patent application n. BS95000053, the raising of the additional iron bars with respect to the bottom of the brick base is obtained by means of projections carried out during the molding of the brick bases that make up the joist. These projections are situated on the bottom at regular intervals and are obtained through a sort of impression made on the bottom of the brick base by raising the brick with respect to the bottom itself.

The opinion according to which this type of solution does not ensure compliance with the law is well-founded, since in correspondence with the projections the additional iron bar rests directly on the brick and therefore in these points the structure does not comply with the law. Considering that a beam is provided with a plurality of these supports, there are several points in which the structure does not comply with the law.

The present invention is aimed at eliminating the above mentioned drawbacks.

The goal of the invention is the implementation of a prefabricated joist in which the additional iron bars provided to reinforce the structure of the metal framework are spaced from the bottom of the brick bases. In particular, there must not be any contact between the brick and any part of the additional iron bars and the addi-

tional iron bars must be enveloped by concrete as prescribed by law.

The goals mentioned above and other goals that will be better highlighted below have been achieved through the implementation of a prefabricated brick joist for floors or lintels that, according to the main claim, comprises a plurality of substantially U-shaped brick bases defining a channel in which the iron bars belonging to the framework or additional iron bars are positioned and which is to be filled with concrete, said joist being characterized in that it comprises a plurality of U-bolts having their ends buried in the brick base and being spaced at regular intervals and aligned with one another in such a way as to define at least one rectilinear support for at least one additional iron bar spaced from the bottom of said brick base, said iron bar remaining within the outline defined by the brick base channel filled with concrete.

According to a particular application of the invention, each U-bolt is made of a wire positioned in the brick before this is baked. Metal straps or other similar materials can be used instead of wire, provided that they are compatible with concrete.

Each brick base is preferably, but not necessarily, provided with an U-bolt aligned with other U-bolts belonging to other brick bases. The joist can even make use of only some of the brick bases with U-bolt belonging to the invention, but not necessarily of all of them. The important feature is that the support offered by the U-bolts must be such as to guarantee that every single point of the additional iron bar is spaced from the brick base bottom.

Further characteristics and details of the invention will be better highlighted in the description of two favourite applications among many of the invention in question, illustrated in the attached drawings, wherein:

- Fig. 1 is a partial perspective view of the joist object of the invention in question;
- Fig. 2 shows the brick base used to make the joist object of the invention before the insertion of the U-bolt;
- Fig. 3 shows a section of the joist of Figure 1;
- Fig. 4 is a variant of the joist of Figure 1, in which two additional iron bars for the framework and therefore two rectilinear supports for said additional iron bars are provided;
- Fig. 5 shows the installation of two U-bolts for each support of the additional iron bars;
- Fig. 6 shows a section of the joist of Figure 4;
- Fig. 7 shows a section of an example of brick base suitable for the construction of lintels according to the invention in question.

With reference to the figures described above, it can be observed that the joist, indicated as a whole by 1, is provided with a plurality of substantially U-shaped brick bases 2 suitable for defining a channel 3 inside

which the base of a framework indicated by 4 is to be placed, whose base iron bars 41 and 42 rest on the concave sides 21 and 22 present in the brick bases 2. During the molding of the brick base 2 and before its baking, a U-bolt 5 with two sides 51 and 52 and a concave part 53 is introduced at a predetermined distance from one of the two ends of the brick base. The ends 51 and 52 are buried in the bottom 23 of the brick base 2 for a length sufficient to fix said U-bolt 5 when the brick is still malleable, because it has not been baked yet. It can be easily understood that after the baking of the brick the U-bolt 5 will be definitively fixed in the brick base 2. The burying of the U-bolt 5 is carried out in such a way as to guarantee that, as shown in Figure 3, the distance of the base 53 of the U-bolt from the bottom 23 is at least 5 mm, as prescribed by the regulations in force.

It is evident that in this way, when the additional iron bar 6 is placed on the rectilinear support defined by the series of aligned U-bolts 5, the distance of each U-bolt 5 from the bottom 23 will be such as to guarantee that the concrete with which the brick base 2 is filled surrounds the iron bar 6 completely, thus ensuring compliance with the building construction regulations in force.

The same thing occurs when, instead of one additional iron bar, the construction of the joist requires two additional iron bars 7 and 8, as shown in Figure 4. In this case the brick base 20, shown also in Figure 5, is provided with two equally spaced U-bolts 5, as shown in Figure 4, which constitute two distinct rectilinear supports for the two additional iron bars 7 and 8. As it can be observed in the figures described above, the U-bolts are preferably constructed with the surface 53 slightly concave, in such a way as to guarantee that the additional iron bars will be held in the correct position during the concrete casting.

According to a favourite application of the invention in question, the U-bolts 5 are made of a metal strap and are placed in the brick before its baking by means of a machine resembling a seamer.

Beside being made of metal straps, the U-bolts can also be made of wire or other material, provided that any material used is compatible with concrete and with the prefabricated item.

Figure 7 shows a section of a type of brick base 30 used for the construction of door and window lintels. The brick base is filled with concrete after the introduction of the iron bars 9 that must also be spaced from the bottom 31 of the brick base. Therefore, even in this case the required distance between the iron bars and the brick base bottom is guaranteed.

It is clear that the solution object of the invention complies with all the requisites prescribed by law. In fact, the iron bars rest on the U-bolts and therefore the contact takes place between two iron surfaces, and concrete envelops the entire additional iron bar, thus ensuring the necessary distance between iron bar and brick, as prescribed by law.

## Claims

1. Prefabricated brick joist for floors or lintels (1; 10), comprising a plurality of substantially U-shaped brick bases (2; 20) that define a channel (3) in which the iron bars belonging to a framework (4) or additional iron bars are positioned and which is to be filled with concrete, **characterized in that** it comprises a plurality of U-bolts (5) having their ends (51, 52) buried in the bottom (23) of said brick base and being spaced at regular intervals and aligned with one another in such a way as to define at least one rectilinear support for at least one additional iron bar (5, 6, 7) spaced from the bottom (23) of said brick base, said iron bar remaining within the outline defined by the brick base channel filled with concrete.
2. Joist according to claim 1), **characterized in that** the distance between the support surface of said U-bolt and the bottom of said brick base is at least 5 mm.
3. Joist according to claim 1) or 2), **characterized in that** said U-bolts constitute two rectilinear supports for two additional iron bars.
4. Brick base (2; 20) for joist according to claim 1), 2) or 3), **characterized in that** each U-bolt (5) is fixed to said brick base through the partial burying of its ends (51, 52) in the bottom (23) of the brick base before the baking of said brick base (2; 20), so deep as to ensure the spacing of the brick base bottom from the part of said U-bolt supporting the iron bar.
5. Brick base (30) according to claim 4), suitable for the construction of door or window lintels, **characterized in that** it is provided with two or more U-bolts (5) buried in the bottom (31) of said brick base, said U-bolts being arranged in such a way as to constitute, together with other brick bases, two or more rectilinear supports for iron bars to be buried into the concrete cast in said brick base.
6. Brick base according to claim 4) or 5), **characterized in that** the part (53) of each U-bolt (5) on which the additional iron bar rests is concave, in such a way as to facilitate the positioning of said additional iron bar.
7. Brick base according to claim 5) or 6), **characterized in that** each U-bolt is made of a metal strap.
8. Brick base according to claim 5) or 6), **characterized in that** each U-bolt is made of wire.

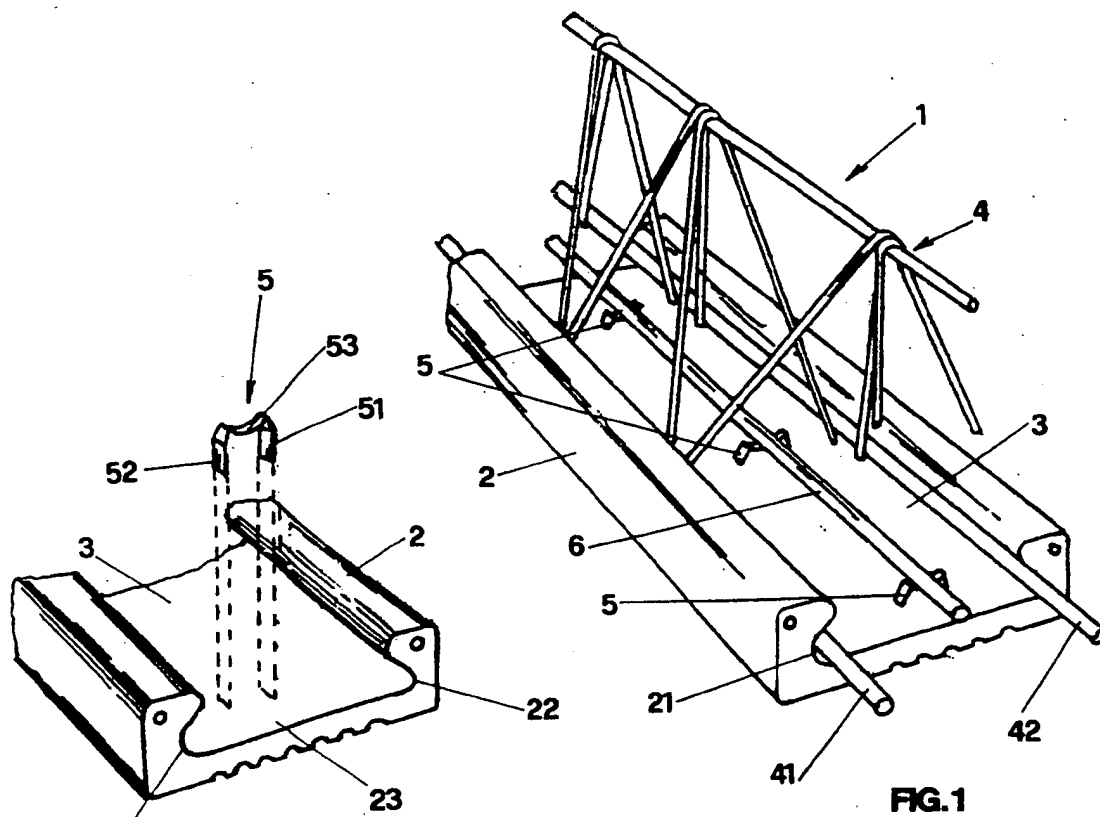


FIG.2

FIG.1

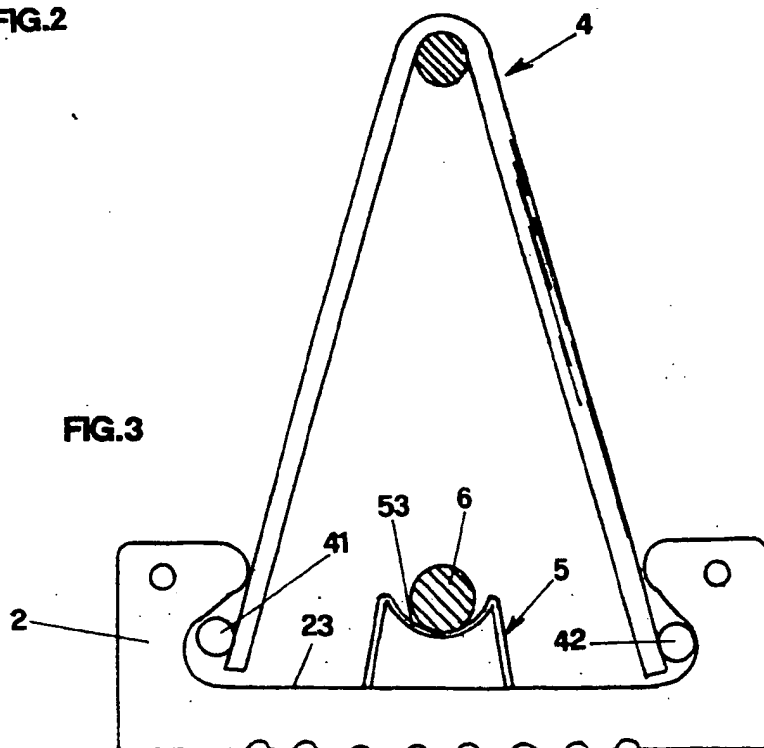


FIG.3

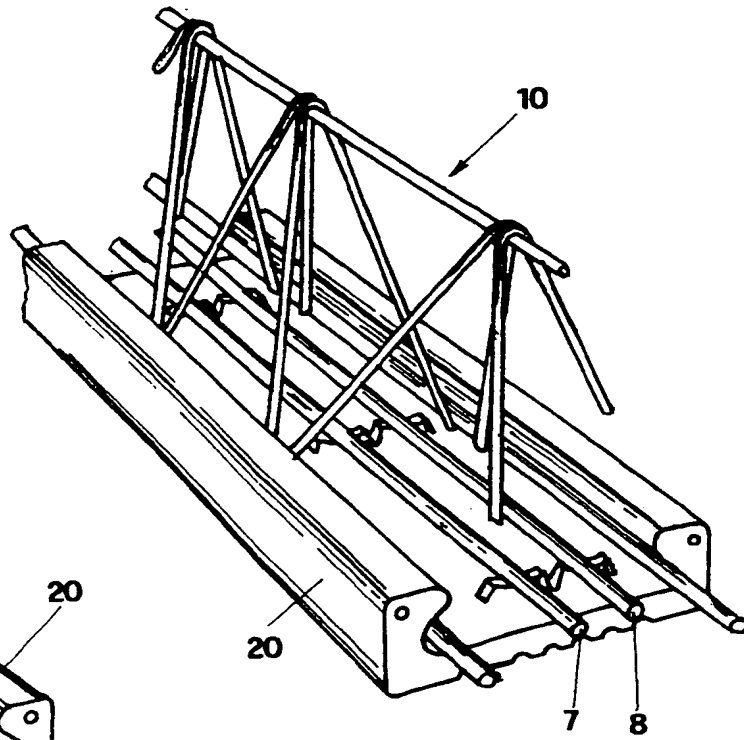


FIG. 4

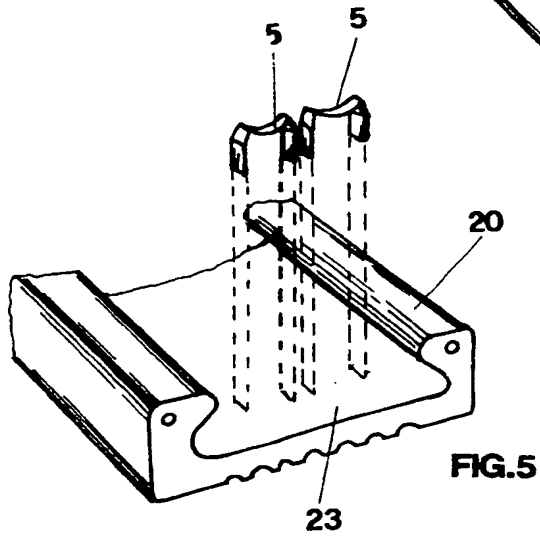


FIG. 5

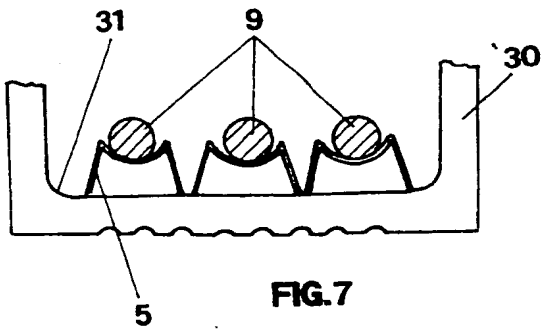


FIG. 7

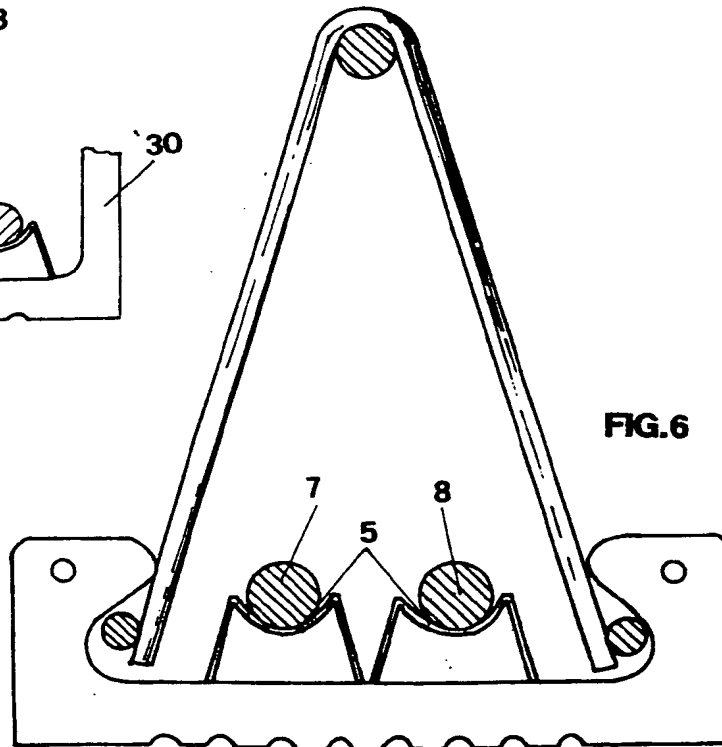
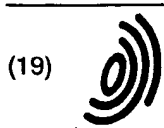


FIG. 6



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(72) Inventor: **Zarantonello, Mario**  
**36033 Isola Vicentina (VI) (IT)**

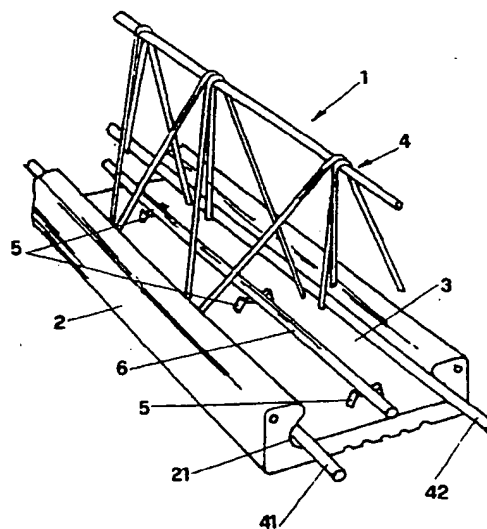
(74) Representative: **Bonini, Ercole**  
**c/o STUDIO ING. E. BONINI SRL**  
**Corso Fogazzaro 8**  
**36100 Vicenza (IT)**

(30) Priority: **11.04.1997 IT VI970056**

(71) Applicant: **Gruppo Effe 2 SpA**  
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**FIG.1**

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# EUROPEAN SEARCH REPORT

Application Number  
EP 98 10 6305

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IntCl.6)
Y,D	IT BS950053 U (BARBIERI IGNAZIO) 9 December 1996 (1996-12-09) * the whole document *	1,3-7	E04C5/065 E04C3/02 E04C5/18
Y	DE 20 17 101 A (OLTMANN) 21 October 1971 (1971-10-21)	1,3-7	
A	* page 2, paragraph 4 - page 3, paragraph 1 *	2	
	* page 4, paragraph 3 *		
	* page 5, paragraph 2 *		
	* figures 1-4 *		
A	FR 2 548 718 A (BROCHET DENIS) 11 January 1985 (1985-01-11)	1,8	
	* page 3, line 19 - page 3, line 28 *		
	* figures 3-6 *		
A	DE 24 04 281 A (DATZ HERMANN DR) 7 August 1975 (1975-08-07)	1,3	
	* claim 1; figures 1-6 *		
A	DE 33 18 764 A (JUWOE ENG GMBH) 12 April 1984 (1984-04-12)	1,4	
	* claims 8,9; figures 1-4 *		
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IntCl.6) E04C E04B
Place of search THE HAGUE		Date of completion of the search 5 October 1999	Examiner Hendrickx, X
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ON EUROPEAN PATENT APPLICATION NO.**

EP 98 10 6305

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05-10-1999

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
IT BS950053 U	09-12-1996	NONE	
DE 2017101 A	21-10-1971	NONE	
FR 2548718 A	11-01-1985	NONE	
DE 2404281 A	07-08-1975	NONE	
DE 3318764 A	12-04-1984	BE 897912 A	30-01-1984
		CH 662603 A	15-10-1987
		LU 84995 A	16-03-1984
		NL 8303395 A	01-05-1984

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